

**Manuscript version: Author's Accepted Manuscript**

The version presented in WRAP is the author's accepted manuscript and may differ from the published version or Version of Record.

**Persistent WRAP URL:**

<http://wrap.warwick.ac.uk/114066>

**How to cite:**

Please refer to published version for the most recent bibliographic citation information. If a published version is known of, the repository item page linked to above, will contain details on accessing it.

**Copyright and reuse:**

The Warwick Research Archive Portal (WRAP) makes this work by researchers of the University of Warwick available open access under the following conditions.

© 2019 Elsevier. Licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International <http://creativecommons.org/licenses/by-nc-nd/4.0/>.



**Publisher's statement:**

Please refer to the repository item page, publisher's statement section, for further information.

For more information, please contact the WRAP Team at: [wrap@warwick.ac.uk](mailto:wrap@warwick.ac.uk).

## **Mortality decrease according to socioeconomic groups: inconclusive evidence.**

Samuel I. Watson, University of Warwick, Coventry, United Kingdom

Richard J. Lilford, University of Warwick, Coventry, United Kingdom

The recent article by Regidor and colleagues[1] analyses the impact of the economic crisis in Spain on age-adjusted mortality rates for different socioeconomic groups. We wish to point out that the results are consistent with a hypothesis of no difference between people of different socioeconomic status groups despite the authors' conclusions.

Firstly, the economic crisis may have led people to change socioeconomic status.

Household floor space and number of cars are used as proxies for socioeconomic status; the crisis may have caused households to downsize or to sell a car. The expected effect of this would be to reduce mortality rates in lower socioeconomic status groups.

Secondly, in relative terms the reduction in all-cause mortality is approximately the same between socioeconomic status groups, at around 15%. Different absolute rates may just reflect the distribution of the burden of disease.

Thirdly, in Spain average healthcare expenditure per capita in the period 2004-7 was approximately \$2,300, while in the period 2008-11 it was \$3,000.[2] This may explain the observed declines, especially when point two is taken into consideration.

Fourthly, a widely made statistical error is to assume that the difference between "significant" and "not significant" is itself statistically significant.[3] While within group changes are tested, no hypothesis tests are conducted to compare changes between different groups. Without these comparisons, conclusions cannot be made without running the risk of falling foul of the aforementioned error.

To make accurate inferences from observational data appropriate caution must be taken to select, test, and compare appropriate models. Without this rigour few conclusions are tenable.

## References

- [1] Regidor E, Vallejo F, Granados JAT, Viciano-Fernandez FJ, de la Fuente L, and Barrio G. Mortality decrease according to socioeconomic groups during the economic crisis in Spain: a cohort study of 36 million people. *Lancet*. 2016; (published online Oct 13.)[http://dx.doi.org/10.1016/S0140-6736\(16\)30446-9](http://dx.doi.org/10.1016/S0140-6736(16)30446-9).
- [2] World Bank. Healthcare Expenditure per capita (current US\$) Spain.  
<http://data.worldbank.org/indicator/SH.XPD.PCAP?locations=es>. (Accessed October 24<sup>th</sup>, 2016)
- [3] Gelman, A and Stern, H. The Difference Between “Significant” and “Not Significant” is not Itself Statistically Significant. *The American Statistician* 2006; **60**(4): 328-31.